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PRODUCTION OF NEW ECO-MATERIALS BASED ON POLY (LACTIC ACID) AND NATURAL FIBERS

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Abstract

Recently the use of renewable resources for the production of polymer-based materials has attracted a growing attention, both in academia and industry, as a result of the increasing demand of environmental friendly materials. In this paper, biodegradable poly(lactic acid) (PLA) based eco-composites reinforced with natural kenaf fibers and rice hulls were prepared by compression moulding and their properties were compared to those of commonly used thermoplastic based-polymer, polypropylene (PP) containing the same reinforcements.

Rice hulls from rice processing plants and natural lignocellulosic kenaf fibers represent renewable sources that could be utilized for production of new class of eco-materials. Maleic anhydride grafted PLA (MAPLA) and maleic anhydride grafted PP (MAPP) were used as coupling agents (CA) to improve the compatibility and adhesion between fibers and polymer matrix. The obtained results have shown that natural fiber based composites with both investigated polymer matrices (biodegradable PLA and nondegradable PP) could be utilized for production of new eco-materials with acceptable mechanical properties.

Key words: eco-composites, poly(lactic acid), polypropylene, rice hulls, kenaf fibers, compression moulding.

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NOVI EKOLOSKI MATERIJALI VRZ OSNOVA NA POLIMLECNA KISELINA I PRIRODNI VLAKNA

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Izvod

Vo posledno vreme, upotrebata na obnovlivite izvori za proizvodstvo na polimerni materijali go privlece vnimanieto na akademskite institucii i industrijata, a toa rezultirase vo zgolemuвање na interesot za ekoloskite materijali. Vo ovoj trud, bea procesirani po kompresiona postapka kompoziti na osnova na polimlecna kiselina (PLA) zajaknati so kenaf vlakna ili orizovi luspi i bea sporeduvani so kompoziti na osnova na termoplasticna matrica (polipropilen PP) zajaknati so istite zajaknuvaci. Orizovite luspi i kenaf vlaknata pretstavuvaat obnovlivi izvori koi mozat da se koristat za kompoziti. Kako kompatibiliziracki agensi bea koristen: kalem PP so maleinski anhidrid (MAPP) i kalemna PLA so maleinski anhidrid (MAPLA). Dobienite rezultati pokazaa deka kompozitite so dvete polimerni matrici zajaknati so prirodni vlakna moze da se iskoristat za proizvodstvo na novi ekoloski materijali so prifatlivi mehanicki svojstva.

Ključne riječi: *eco-kompoziti, polimlecna kiselina, polipropilen, orizovi luspi, kenaf vlakna, kompresiona postapka*